

Chemicals



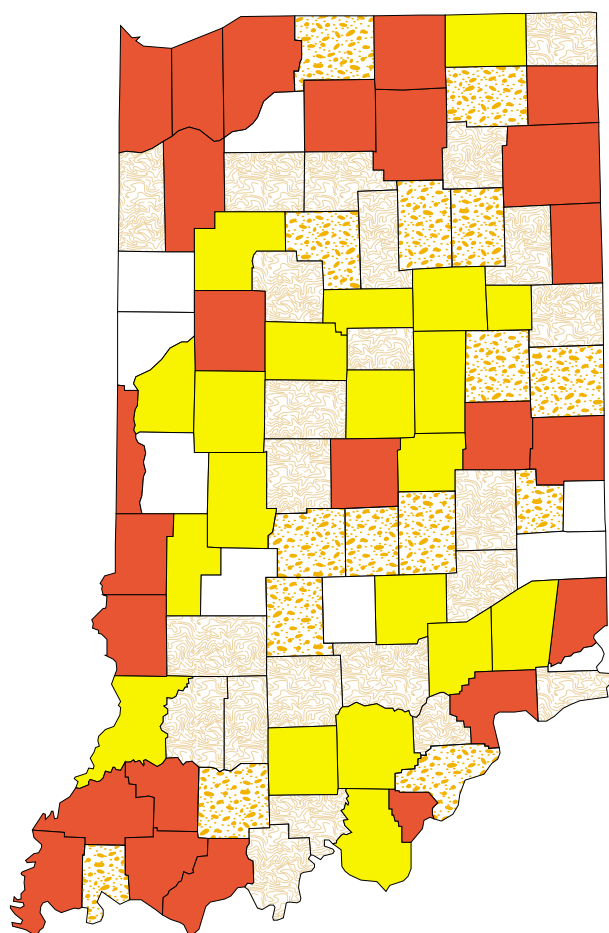
Photo by Richard Fields, Indiana Department of Natural Resources.

You better not fool with a Bumblebee! —
Ef you don't think they can sting — you'll see!

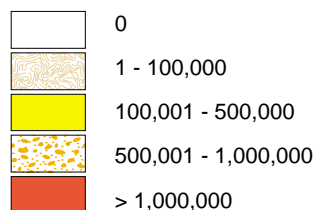
"The Bumblebee"

James Whitcomb Riley (1849-1916)

Toxic chemical releases from manufacturers



Pounds of reported releases



CHEMICALS IN INDIANA'S ENVIRONMENT

Just as air pollution blows freely across county lines and water pollution flows downstream, many chemicals affect multiple segments of our environment. Many of these pollutants are toxic chemicals that persist in the environment and can cause long-term health effects or pose serious environmental threats. EPA created the Toxic Release Inventory to provide accurate information about potentially hazardous chemicals and their uses to help communities hold companies accountable and make informed decisions about how toxic chemicals are to be managed. Lead, mercury and polychlorinated biphenyls (PCBs) are three additional chemicals of concern because they build up in the environment.

The EPA and IDEM collect information on toxic chemicals used by manufacturers through the Toxic Release Inventory (TRI). Facilities must file a TRI report if they have 10 or more employees, are included in Standard Industrial Classification codes that are required to report, and manufacture, process or use a listed toxic chemical in quantities greater than established thresholds in a calendar year.

For more information about Indiana's Toxic Release program, or to review specific data, go to our website at www.state.in.us/idem/oppta/tri.

RELEASES TO THE ENVIRONMENT FROM INDUSTRY

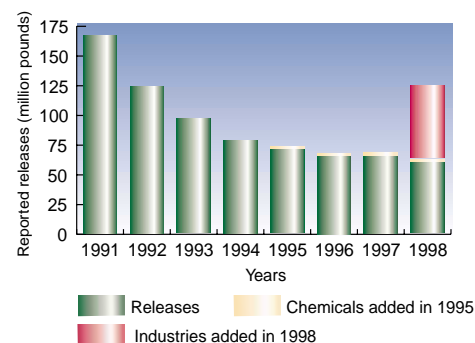
Indiana manufacturers reduced their reported releases of toxic chemicals from 167 million pounds in 1991 to 60 million pounds in 1998. This 64 percent reduction is based on chemicals and facilities that were subject to reporting for each of the eight years. The total reported releases dropped nearly eight percent in one year – from 65 million pounds in 1997 to 60 million in 1998. These reductions occurred despite a reported increase in industrial production of approximately 30 percent.

As a result of TRI reporting requirement changes, Indiana experienced a 75 percent increase in the total amount of toxic chemical releases reported. As shown in the bar chart, the total amount of reported releases to the environment increased from 76 million pounds in 1997, to 133 million in 1998.

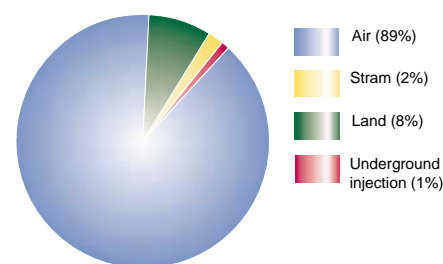
Releases to air account for 89 percent of the total releases. Six chemicals – hydrochloric acid, sulfuric acid, toluene, styrene, ammonia and xylene – contributed almost 53 percent of the air releases in 1998.

Lake and Gibson counties had the most releases among Indiana's 92 counties. Electric generating facilities accounted for 97 percent of release for the six sectors reporting for the first time in 1998 in Indiana. These two counties contributed more than 24 percent of the total toxic chemical releases.

Trends in toxic chemical releases



Type of toxic chemical releases



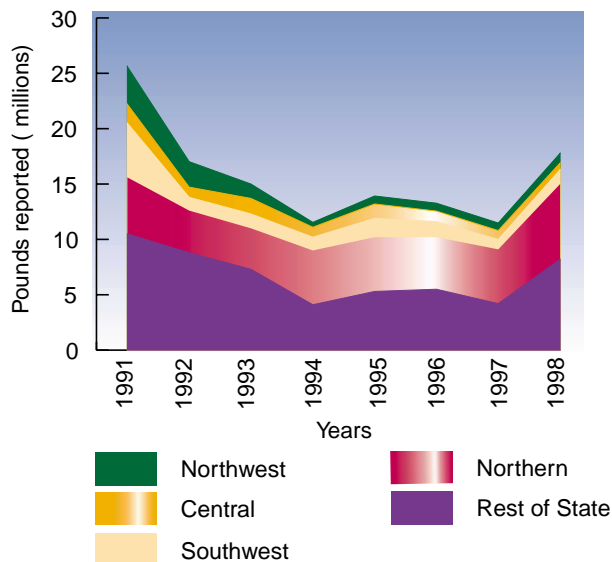
Releases reported as transfers to permitted landfills are not reflected in this pie chart. However, all reported land releases are included in the totals for 1998 used throughout the rest of this chapter.

Graph and chart source: IDEM's Toxic Release Inventory database, 1998

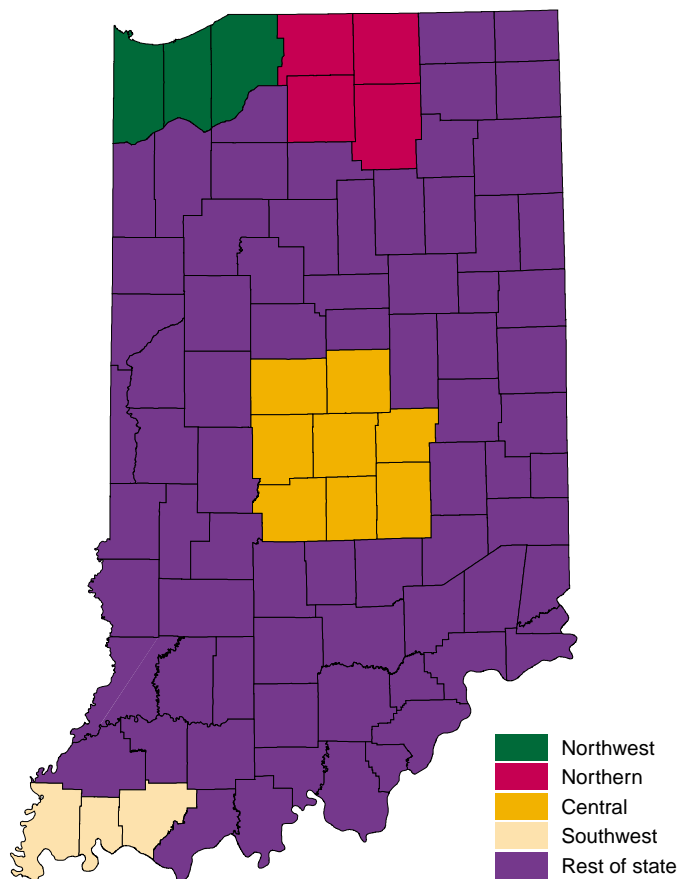
To improve the quality and quantity of data submitted to the TRI, changes are often made in the reporting requirements. In 1994, EPA added 300 new chemicals or chemical compounds to the list of reportable substances for the 1995 reporting year. In May 1997, EPA added seven new industry sectors for the 1998 reporting year, which is the newest data in this report. The seven new industries are electricity generating facilities; Resource Conservation and Recovery Act (RCRA) transfer, storage and disposal facilities; coal mining; metal mining; petroleum bulk terminals; solvent recovery facilities; and chemical and allied product manufacturers.

The overall effect of the changes is an increase in the total pounds reported to TRI. For the most part, these same releases and waste transfers occurred in prior years, but were not required to be reported to the TRI. Also, in the past the State of the Environment reports the release information excluded wastes that were transferred to permitted landfills. In this report, all transfers are included (except where noted).

Trend in known and potential carcinogen releases



Priority urban areas for carcinogens



KNOWN AND POTENTIAL CARCINOGENS

The TRI relies on the Occupational Safety and Health Administration's (OSHA) definition of "carcinogen" to identify chemicals that warrant added attention due to their potential to cause cancer in humans. The OSHA definition includes chemicals determined to be known, probable or possible carcinogens.

Reported carcinogen releases in 1998 are 31 percent lower than 1991 reported values, although a 27 percent increase occurred between 1995 and 1998. Styrene, methylene chloride and trichlorethylene account for about 65 percent of carcinogen releases in 1998.

Indiana has designated four regions with large urban populations and significant manufacturing activity as priority regions. These four regions account for 54 percent of the total reported releases of carcinogenic chemicals in 1998, with Elkhart County contributing almost 28 percent of total reported releases.

The central and southwest regions reduced their reported carcinogen releases by 55 percent and 23 percent respectively, between 1995 and 1998. The northwest and northern regions increased their releases by 22 percent and 38 percent respectively, between 1995 and 1998. The rest of state experienced a 52 percent increase between 1995 and 1998. The increase in the northern region in 1998 comes from a change in the method for estimating styrene emission by the fiber reinforced plastic industry. Reported releases of styrene have increased 19 percent from last year.

These trends in total carcinogen releases are shown in the graph at the upper left, where total releases are represented by the width of each colored ribbon. A narrowing ribbon, for example, represents a decreasing trend, and vice versa.

ENVIRONMENTAL WASTE FROM INDUSTRY

In addition to reporting releases of toxic chemicals, TRI facilities must report their environmental waste — the amounts of chemicals that are destroyed through treatment, disposed of in landfills, recycled, or burned for energy recovery. These activities may occur either at the reporting facility or at an off-site location. Environmental waste also includes releases described earlier in the chapter.

Between 1991 and 1995, Indiana saw an increase in toxic chemicals in environmental waste of eight percent. From 1997 to 1998, the total decreased less than one percent while production increased 30 percent. The decrease is approximately one-half million pounds.

With six new industry sectors reporting to TRI in 1998, Indiana observed a 19 percent increase in the total amount of environmental waste reported in 1997.

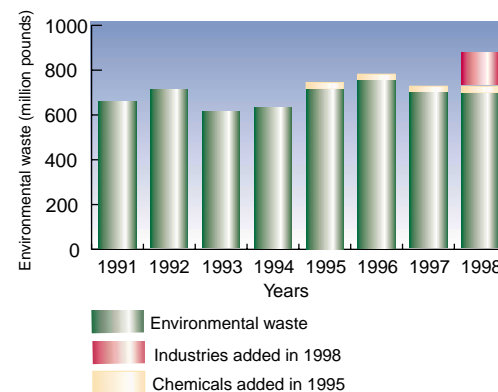
The new industries accounted for 16 percent—151 million pounds, of the total environmental waste reported. Electricity generating facilities and RCRA transfer, storage and disposal facilities accounted for more than 90 percent of the environmental waste reported from the new sectors in the TRI.

Pollution prevention, or source reduction, is a preferred method of environmental protection in Indiana. It includes practices that reduce or eliminate the creation of pollutants by increased efficiency in the use of resources and the conservation of natural resources. Recycling, energy recovery, and treatment or disposal are not pollution prevention.

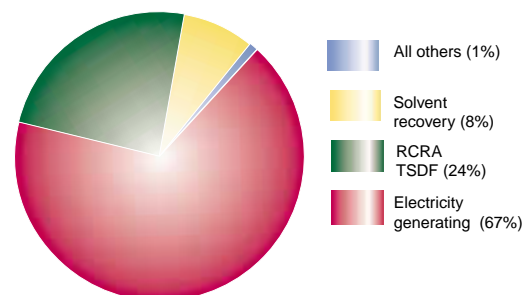
Indiana measures pollution prevention progress for manufacturers using the TRI program. It compares the annual change in toxic chemicals in environmental waste with the annual change in production. The percent change in production minus the percent change in waste is pollution prevention progress.

From 1992 to 1998, Indiana has made a net gain of 11 percentage points in pollution prevention.

Indiana environmental waste generation



New industries' contribution to reported environmental waste



The percentage of Indiana children with higher than normal lead levels is greater than the Centers for Disease Control and Prevention's national average of 4.4 percent. From 1995 to November 1999, 140,000 Indiana children were screened for lead. Nine percent of these children were determined to have elevated levels of lead in their blood.

Elevated blood lead levels test results, 1995-1998



Map source: Indiana State Department of Health,
Childhood Lead Poisoning Prevention Program, 1998

TOXICS OF SPECIAL CONCERN

Lead

Lead is a naturally occurring metal used in piping, building materials, solder, paint and ammunition. Lead paint in homes is believed to be the major source of lead poisoning. Elevated blood lead levels (EBLs) typically are found in low-income areas and areas with older homes. In recent years, lead-acid batteries, metal products, chemicals and pigments have contained the most lead.

Since EPA banned lead in gasoline, paint, pipes, solder, food cans and other products, blood lead levels have dropped dramatically throughout the United States. Blood lead levels for individuals in the United States fell 78 percent, from the 1976-1980 average of 13 micrograms per deciliter (ug/dL) to 3 ug/dL in the 1990's. For the same time periods, the percent of U.S. children with blood lead levels at or above 10 ug/dL fell from 84 percent to 9 percent.

Excessive exposure to lead can elevate blood levels of the toxin in adults and children and can slow and permanently damage the mental and physical development of children age 6 and under.

Elevated Blood Levels (EBLs)

EBLs may result in learning disabilities, behavioral problems, mental retardation and seizures. The severity of these results depends on the degree and duration of the EBL.

10 ug/dL or greater is considered "elevated" and is associated with harmful effects on children's behavior.

15-17 ug/dL for 3 months or 20 ug/dL or greater requires a physician's treatment.

70 ug/dL or greater causes devastating health consequences, including seizures, coma and death.

Source: Centers for Disease Control and Prevention, and National Center for Environmental Health, 1997

Most serious mercury and PCB levels in fish

Two toxic chemicals, mercury and polychlorinated biphenyls (PCBs), are the major contaminants found in Indiana fish. Mercury is a naturally occurring metal that does not break down but cycles between land, water and air. It is also released by coal-burning power plants and the burning of household, medical and industrial waste. PCBs are synthetic oils that break down slowly in the environment and were widely used in electrical transformers and capacitors.

Health problems resulting from contaminants such as mercury and PCBs found in fish range from nearly undetectable changes to birth defects and cancer, with children being the most susceptible. Mercury may damage the central nervous system, while PCBs may damage the liver, kidneys and central nervous system and are probable human carcinogens.

Mercury and PCBs collect in soil, water, sediment and microscopic animals. They build up in fish, especially in those fish that eat other fish. Each year, the *Indiana Fish Consumption Advisory* is issued by the Indiana State Department of Health through cooperative efforts with IDEM and the Indiana Department of Natural Resources. The advisory serves as a guide for fish consumption, categorizing Indiana waterways in five groups ranging from “unrestricted consumption” (group 1) to “do not eat” (group 5). The map to the right shows the waterways with the greatest mercury and PCB threats in 1998.

For the 1999 Fish Consumption Advisory, more than 1,600 fish tissue samples were analyzed for PCBs, pesticides, and heavy metals. Of those samples, 99% contained mercury. Because of past, widespread agricultural and industrial use of these materials, their great stability and persistence in the environment, and the potential for bioaccumulation, it is not surprising that concentrations exceeding safe levels have been found in some species.



In all Indiana rivers and streams, carp are contaminated with both PCBs and mercury. Do not eat carp that are over 25 inches in length. Pregnant women, women planning to have children, and children under age 15 should not eat carp over 15 inches.

The 1999 Indiana Fish Consumption Advisory is available for viewing and downloading at:

http://www.state.in.us/isdb/dataandstats/fish/fish_99/fish_cvr.htm